

Attachment 2A

NCTA TriEx AVI Retrofit “As Built” Drawings

NCTA

NORTH CAROLINA TURNPIKE

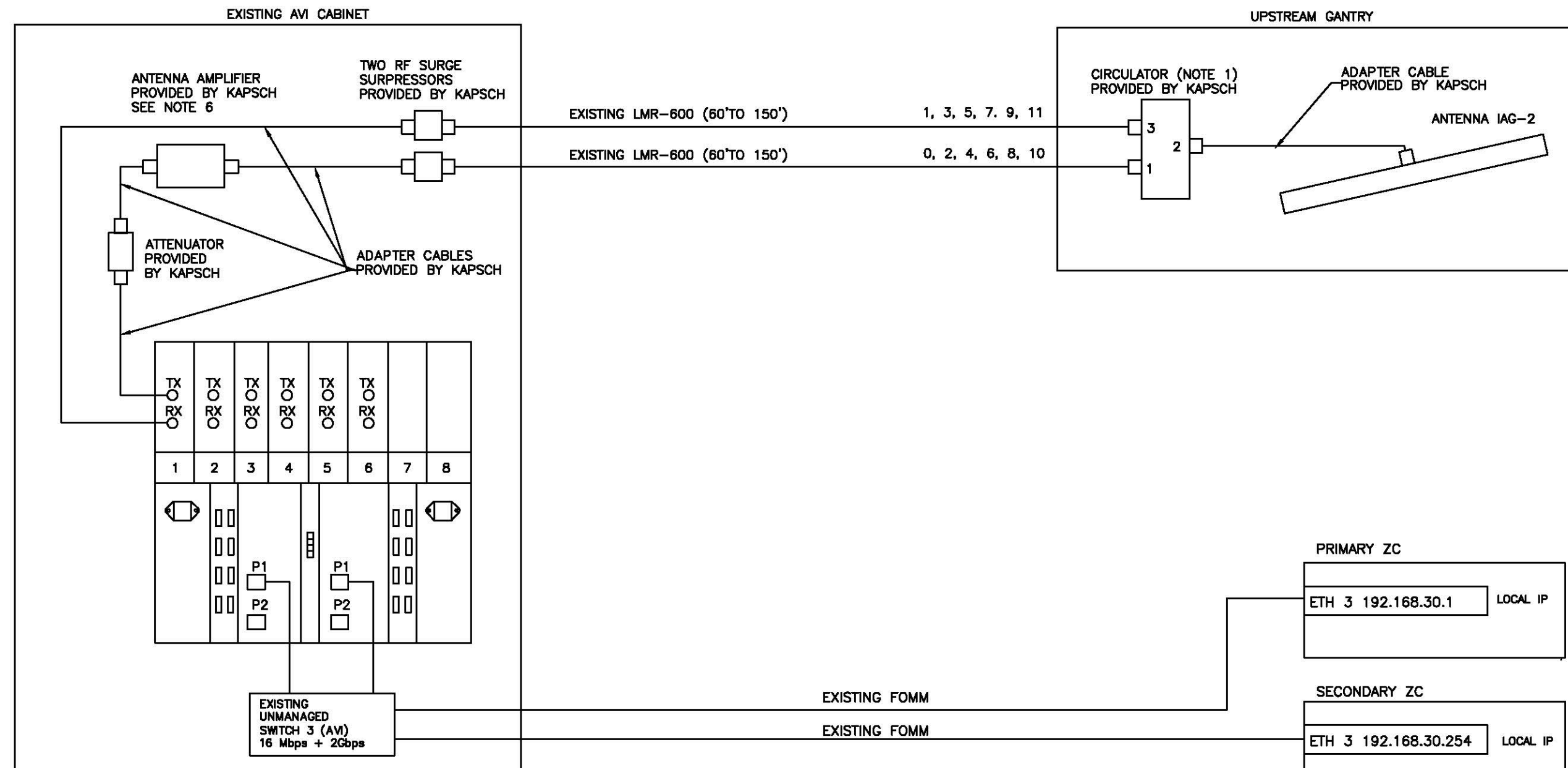
TRIANGLE EXPRESSWAY- AVI SYSTEM RETROFIT

INDEX OF SHEETS

SHEET NO.	DESCRIPTION	REV
E00-RF	LEAD AVI RETROFIT	A
E01-RF	KAPSCH READER WIRING DIAGRAM	A
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E03b-RF	KAPSCH ANTENNA LAYOUT FOR T21	A
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AS-BUILT

B	09/30/17	AS-BUILT
A	07/19/17	INITIAL RELEASE
REV.	DATE	DESCRIPTION
REVISION SUMMARY		



AS-BUILT

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	09-30-17	

CONDUENT

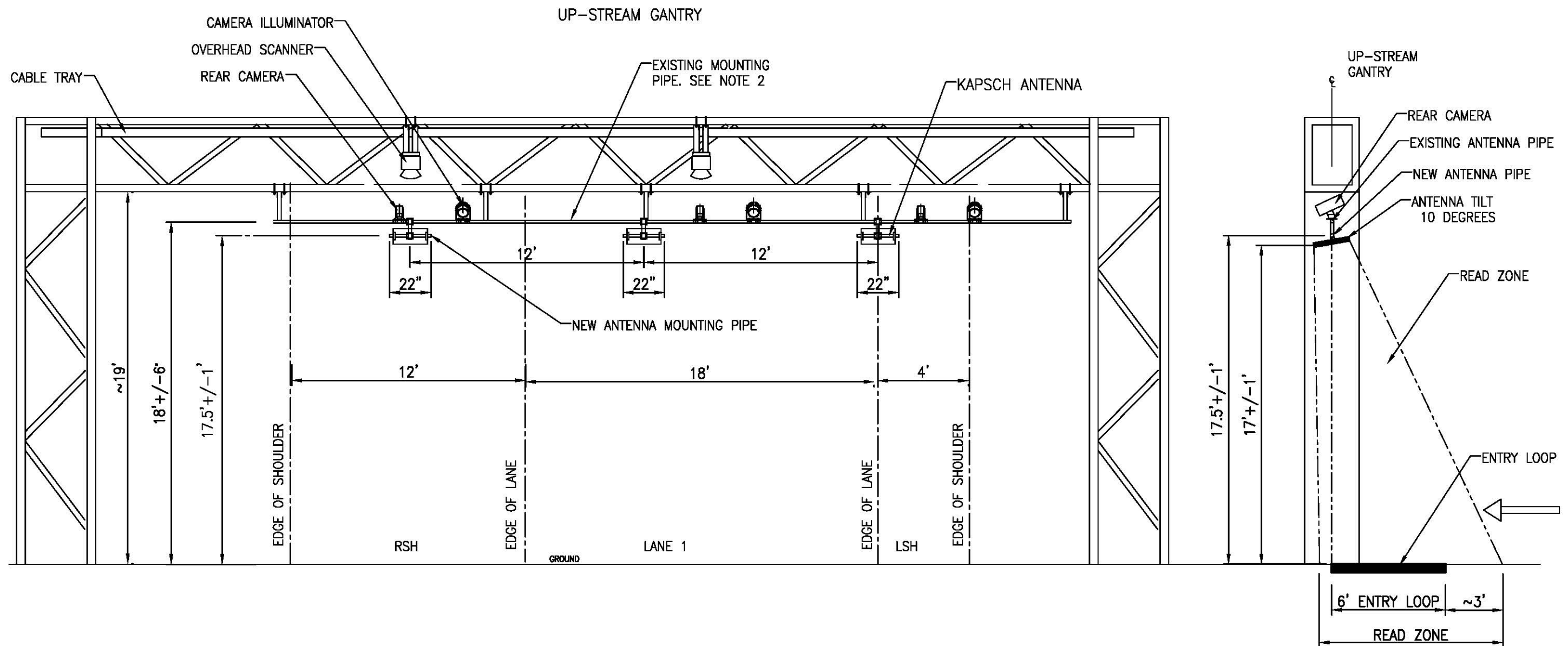
12410 MILESTONE CENTER DRIVE
4TH FLOOR
GERMANTOWN, MD 20876



CONTRACT NO. -
ENGINEER LFUKSON
DATE 07/19/17
DRAWN -
APPROVAL -
APPROVAL -

NCTA
OPEN ROAD TOLLING
KAPSCH READER
WIRING DIAGRAM

SIZE B DRAWING NO. E01-RF REV A
SCALE: N/S SHEET 1 OF 1



NOTE:

1. APPLICABLE TO T29 (2.1), T30 (2.2), THESE TOLL ZONES ARE PICKED UP FOR ILLUSTRATION PURPOSES ONLY.
2. INSTALL A NEW 22" LONG MOUNTING PIPE INDIVIDUALLY FOR EACH ANTENNA AT THE HEIGHT OF 17.5' THAT PLACES THE CENTER OF THE ANTENNA FACE AT 17' HEIGHT FROM THE GROUND AS REQUIRED. BUILD AN ADJUSTABLE MOUNT FOR EACH ANTENNA USING TWO CROSSOVER PLATE KIT SCX1-K FROM VALMONT CO. AND A 2.375" GALVANIZED STEEL PIPE FOR VERTICAL SUPPORT. THE VERTICAL SUPPORT PIPE WILL BE IN THE RANGE OF 18"-43" DEPENDING ON TOLL ZONE. SEE DRAWINGS E02-RF, E07-RF AND E08-RF FOR DETAILS.
3. USE A 2.375" GALVANIZED STEEL PIPE 22" LONG AS ANTENNA MOUNTING BAR FOR EACH KAPSCH ANTENNA.
4. INSTALL ANTENNA 0 OVER THE CENTER OF RIGHT SHOULDER. KEEP LATERAL SPACING BETWEEN ALL OTHER ANTENNAS 12'+/-1'
5. SEE LAYOUT DRAWINGS E03-RF TO E03g-RF FOR MORE DETAILS
6. FOR KAPSCH ANTENNA MOUNTING HEIGHTS SEE DRAWING E08

AS-BUILT

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	09-30-17	

CONDUENT

12410 MILESTONE CENTER DRIVE
4TH FLOOR
GERMANTOWN, MD 20876



CONTRACT NO.

ENGINEER
LFUKSON

DATE
07/19/17

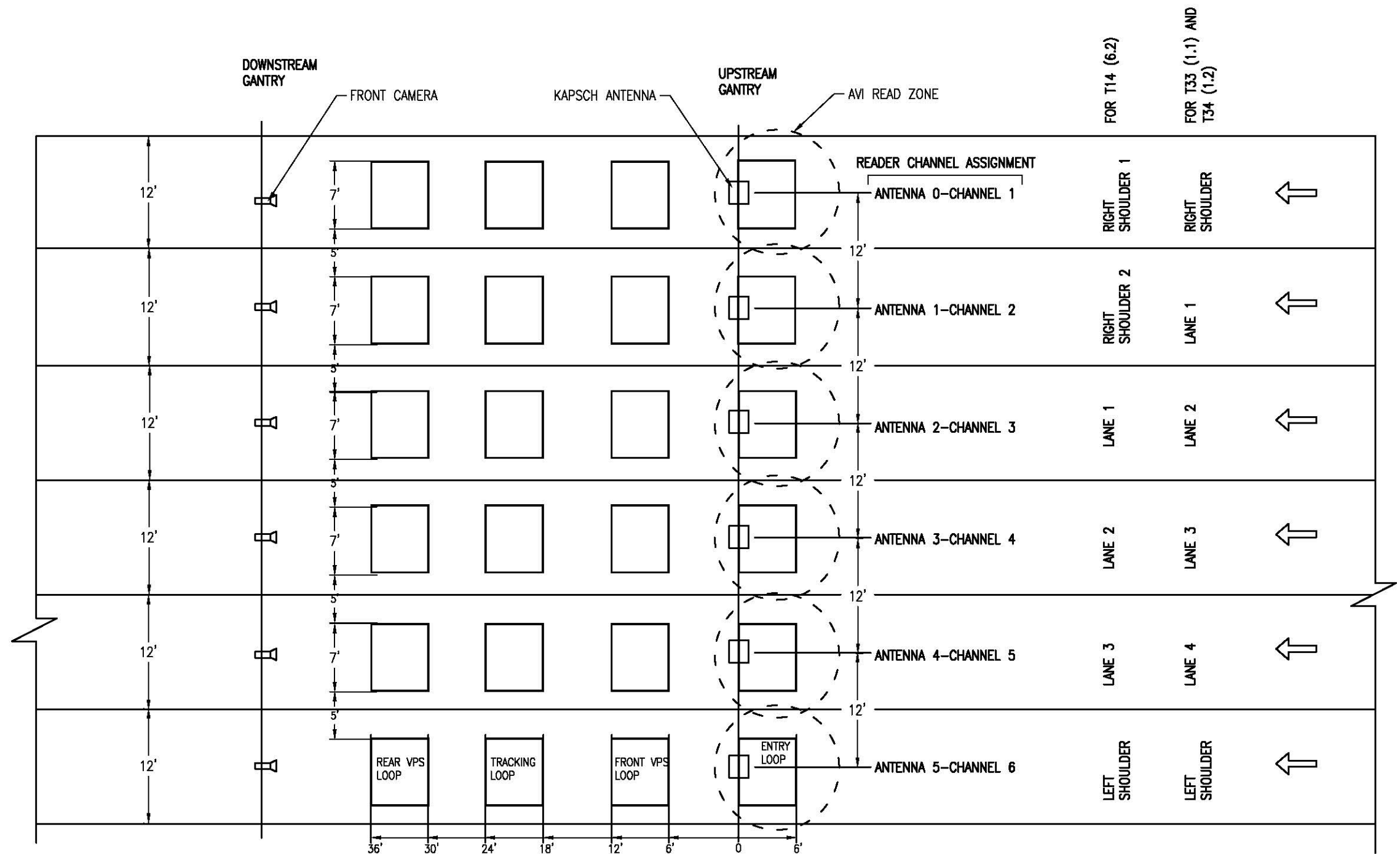
DRAWN
LFUKSON

APPROVAL

APPROVAL

NCTA RTCS
OPEN ROAD TOLLING
TYPICAL GANTRY EQUIPMENT LAYOUT
ANTENNA ELEVATION

SIZE B DRAWING NO. E02-RF REV A
SCALE: N/S SHEET OF



- NOTES:
1. APPLICABLE FOR TOLL ZONES: T14 (6.2), T33 (1.1), T34 (1.2)
 2. ALL ANTENNAS ARE CENTERED OVER THE LANES AND INSTALLED JUST ABOVE THE TRAILING EDGE OF ENTRY LOOP.
 3. INSTALL ONE CIRCULATOR FOR EACH ANTENNA. SEE DRAWINGS E03h-RF AND E01-RF FOR DETAILS.
 4. RE-ROUTE TWO EXISTING LMR-600 CABLES FROM CABLE TRAY TO CIRCULATOR AND RE-TERMINATE THEM IF NEEDED WITH N-MALE RFN-1006-9L2 CONNECTORS. THE CONNECTORS COME WITH MOUNTING KIT SUPPLIED BY KAPSCHI
 5. RUN AND TERMINATE AN ADDITIONAL LMR-600 CABLE TO THE LAST ANTENNA 5
 6. THESE TOLL ZONES CURRENTLY HAVE 11 TRANSORE ANTENNAS INSTALLED

AS-BUILT

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	09-30-17	

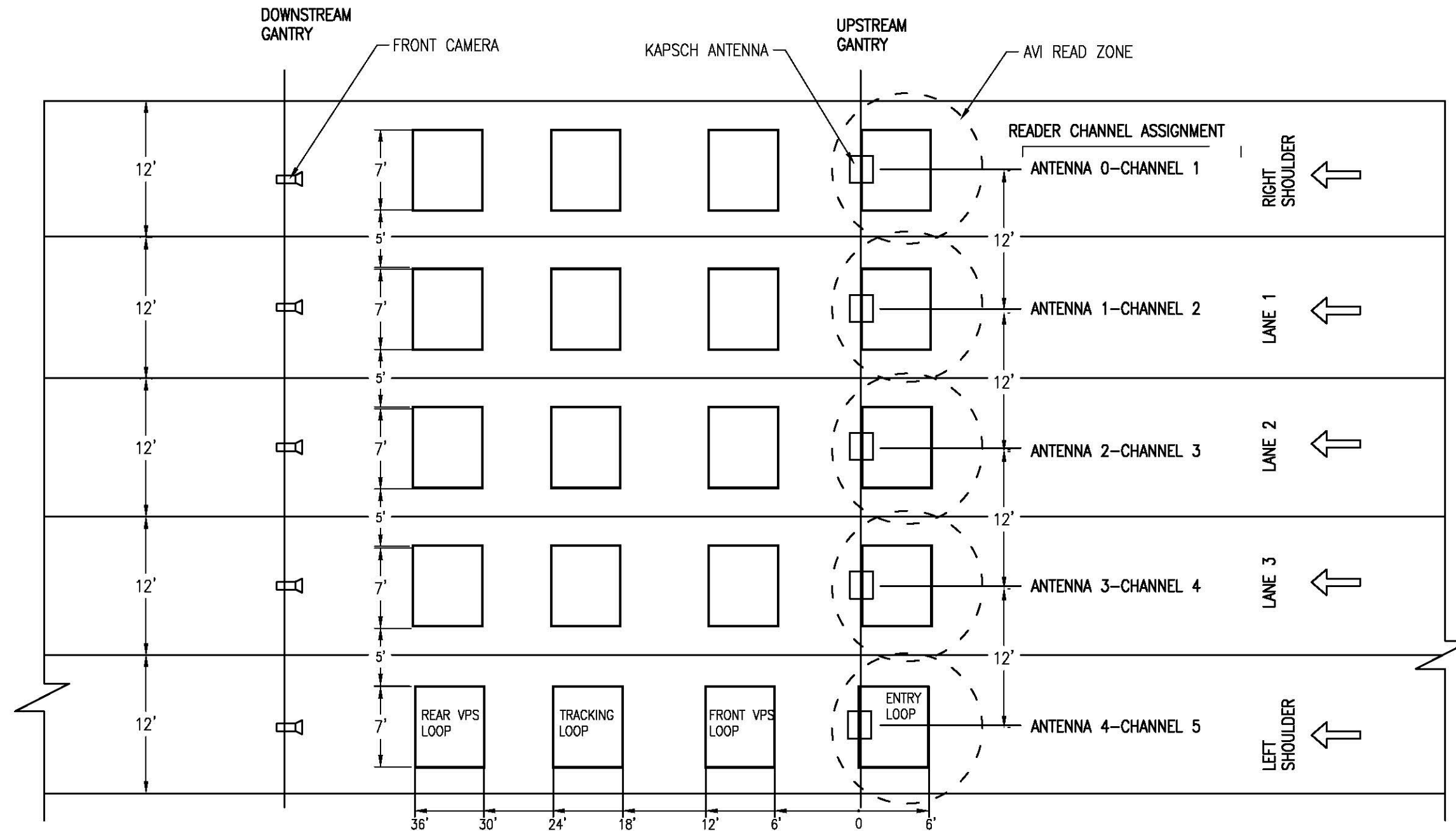
CONDUENT

12410 MILESTONE CENTER DRIVE
4TH FLOOR
GERMANTOWN, MD 20876



CONTRACT NO.	—
ENGINEER	LFUKSON
DATE	07/18/17
DRAWN	—
APPROVAL	—
APPROVAL	—

NCTA RTCS 6 LANE TOLL ZONES T14, T33, T34 KAPSCH ANTENNA LAYOUT		
SIZE B	DRAWING NO. E03-RF	REV A
SCALE: N/S SHEET 1 OF 1		



NOTES:

1. APPLICABLE FOR TOLL ZONES: T25 (3.1), T26 (3.2), T17 (5.1), T18 (5.2), T13 (6.1)
2. ALL ANTENNAS ARE CENTERED OVER THE LANES AND INSTALLED JUST ABOVE THE TRAILING EDGE OF ENTRY LOOP
3. INSTALL ONE CIRCULATOR FOR EACH ANTENNA. SEE DRAWINGS E03h-RF AND E01-RF FOR DETAILS.
4. RE-ROUTE TWO EXISTING LMR-600 CABLES FROM CABLE TRAY TO CIRCULATOR AND RE-TERMINATE THEM WITH N-MALE RFN-1006-9L2 CONNECTORS. THE CONNECTORS COME WITH MOUNTING KIT SUPPLIED BY KAPSCH.
5. RUN AND TERMINATE AN ADDITIONAL LMR-600 CABLE TO THE LAST ANTENNA 4
6. THESE TOLL ZONES CURRENTLY HAVE 9 TRANSORE ANTENNAS INSTALLED

AS-BUILT

REVISION		DATE	APPROVED
LTR	DESCRIPTION		
A	AS-BUILT	09-30-17	

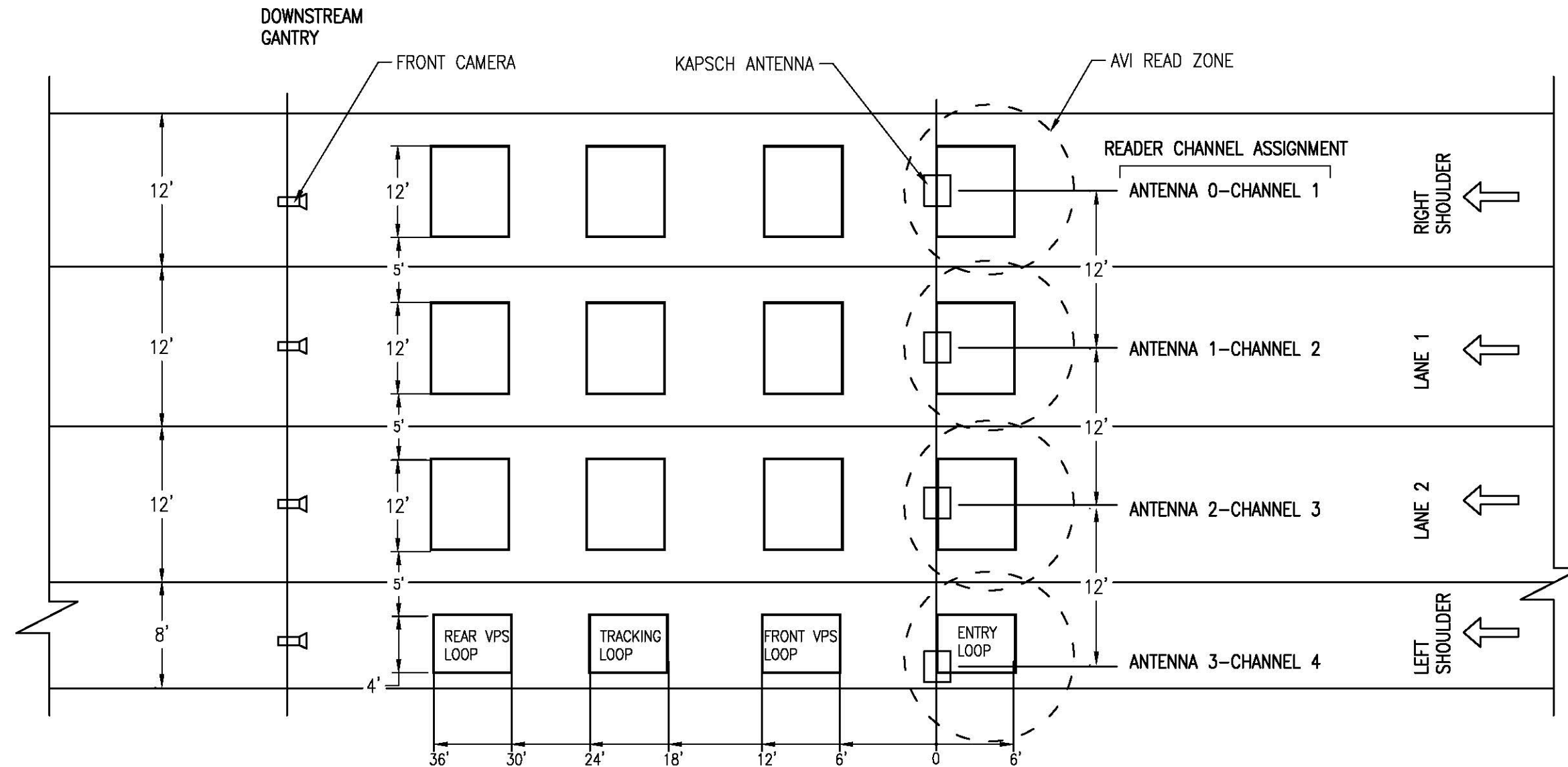
CONDUENT

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CONTRACT NO.	-
ENGINEER	LFUKSON
DATE	07/18/17
DRAWN	-
APPROVAL	-
APPROVAL	-

NCTA RTCS		
5 LANE TOLL ZONES		
T13,T17,T18,T25,T26		
KAPSCH ANTENNA LAYOUT		
SIZE	DRAWING NO.	REV
B	E03a-RF	A
SCALE:	-	SHEET 1 OF 1



NOTES:

1. APPLICABLE FOR TOLL ZONES: T21 (4.1).
2. INSTALL ANTENNA 0 OVER THE CENTER OF RIGHT SHOULDER KEEP ANTENNA LATERAL SPACING 12'+/-1'
3. INSTALL ONE CIRCULATOR FOR EACH ANTENNA. SEE DRAWINGS E03h-RF AND E01-RF FOR DETAILS.
4. RE-ROUTE TWO EXISTING LMR-600 CABLES FROM CABLE TRAY TO CIRCULATOR AND RE-TERMINATE THEM WITH N-MALE RFN-1006-9L2 CONNECTORS. THE CONNECTORS COME WITH MOUNTING KIT SUPPLIED BY KAPSCH
5. RUN AND TERMINATE ADDITIONAL LMR-600 CABLE TO LAST ANTENNA 3
6. THIS TOLL ZONE CURRENTLY HAS 7 TRANSORE ANTENNAS INSTALLED.

AS-BUILT

REVISION		DATE	APPROVED
LTR	DESCRIPTION		
A	AS-BUILT	09-30-17	

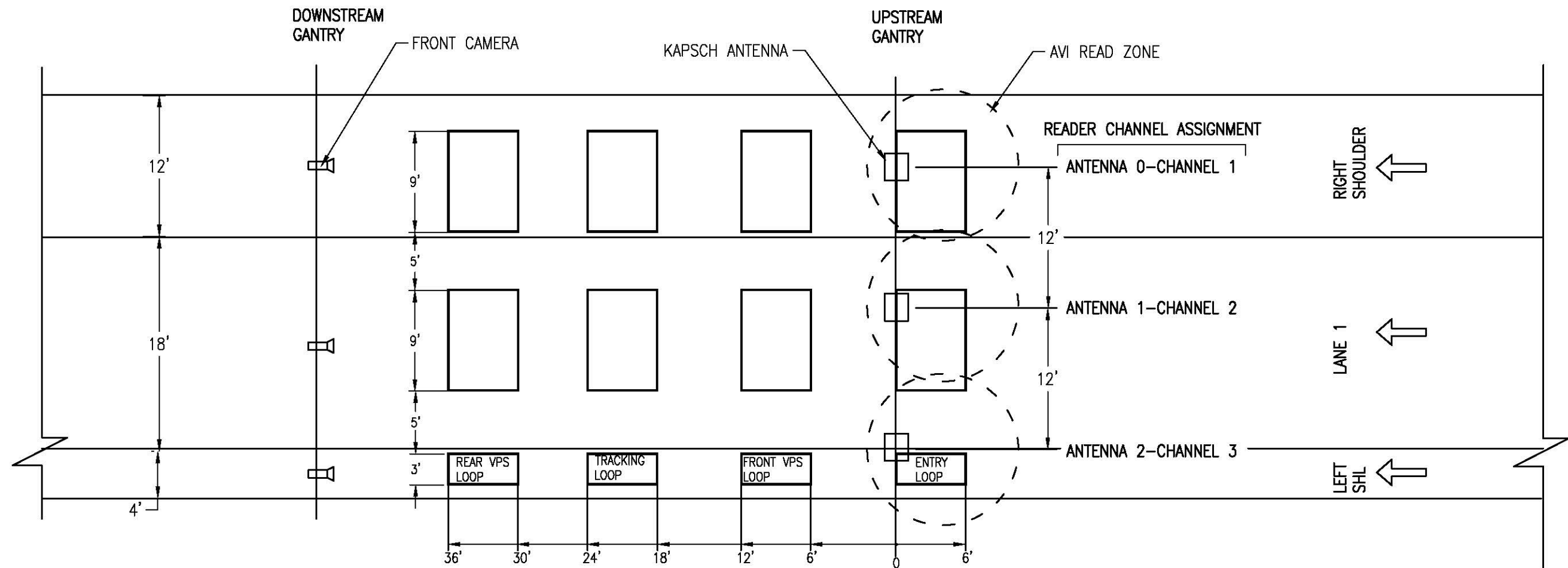
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CONTRACT NO.	-
ENGINEER	LFUKSON
DATE	07/18/17
DRAWN	-
APPROVAL	-
APPROVAL	-

<i>NCTA RTCS</i>		
<i>4 LANE TOLL ZONE</i>		
<i>T21</i>		
<i>KAPSCH ANTENNA LAYOUT</i>		
SIZE	DRAWING NO.	REV
<i>B</i>	<i>E03b-RF</i>	<i>A</i>
SCALE: N/S		SHEET OF



NOTES:

1. APPLICABLE FOR TOLL ZONES: T29 (2.1), T30 2.2).
2. INSTALL ANTENNA 0 OVER THE CENTER OF RIGHT SHOULDER KEEP ANTENNA LATERAL SPACING 12'+/-1'
3. INSTALL ONE CIRCULATOR FOR EACH ANTENNA. SEE DRAWINGS E03h-RF AND E02-RF FOR DETAILS.
4. RE-ROUTE TWO EXISTING LMR-600 CABLES FROM CABLE TRAY TO CIRCULATOR AND RE-TERMINATE THEM WITH N-MALE RFN-1006-9L2 CONNECTORS. THE CONNECTORS COME WITH MOUNTING KIT SUPPLIED BY KAPSCH
5. RUN AND TERMINATE AN ADDITIONAL LMR-600 CABLE TO THE LAST ANTENNA 2
6. THESE TOLL ZONES CURRENTLY HAVE 5 TRANSORE ANTENNAS INSTALLED.

AS-BUILT

REVISION		DATE	APPROVED
LTR	DESCRIPTION		
A	AS-BUILT	09-30-17	

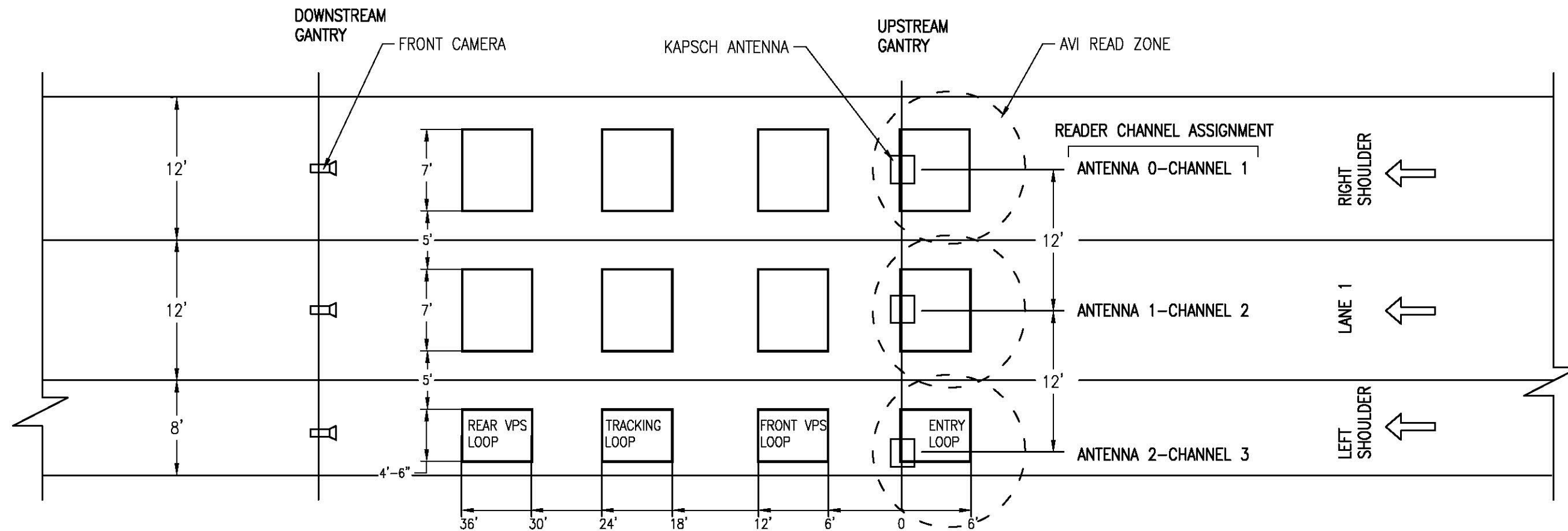
CONDUENT

12410 MILESTONE CENTER DRIVE
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CONTRACT NO.	—
ENGINEER	LFUKSON
DATE	07/18/17
DRAWN	—
APPROVAL	—
APPROVAL	—

<i>NCTA RTCS</i>		
<i>3 LANE TOLL ZONES</i>		
<i>T29, T30</i>		
<i>KAPSCH ANTENNA LAYOUT</i>		
SIZE	DRAWING NO.	REV
<i>B</i>	<i>E03c-RF</i>	<i>A</i>
SCALE:	N/S	SHEET OF



- NOTES:
1. APPLICABLE FOR TOLL ZONES: T22 (4.2).
 2. INSTALL ANTENNA 0 OVER THE CENTER OF RIGHT SHOULDER KEEP ANTENNA LATERAL SPACING 12' +/- 1'
 3. INSTALL ONE CIRCULATOR FOR EACH ANTENNA. SEE DRAWINGS E03h-RF AND E01-RF FOR DETAILS.
 4. RE-ROUTE TWO EXISTING LMR-600 CABLES FROM CABLE TRAY TO CIRCULATOR AND RE-TERMINATE THEM WITH N-MALE RFN-1006-9L2 CONNECTORS. THE CONNECTORS COME WITH MOUNTING KIT SUPPLIED BY KAPSCH
 5. RUN AND TERMINATE AN ADDITIONAL LMR-600 CABLE TO THE LAST ANTENNA 2
 6. THIS TOLL ZONE CURRENTLY HAS 5 TRANSORE ANTENNAS INSTALLED.

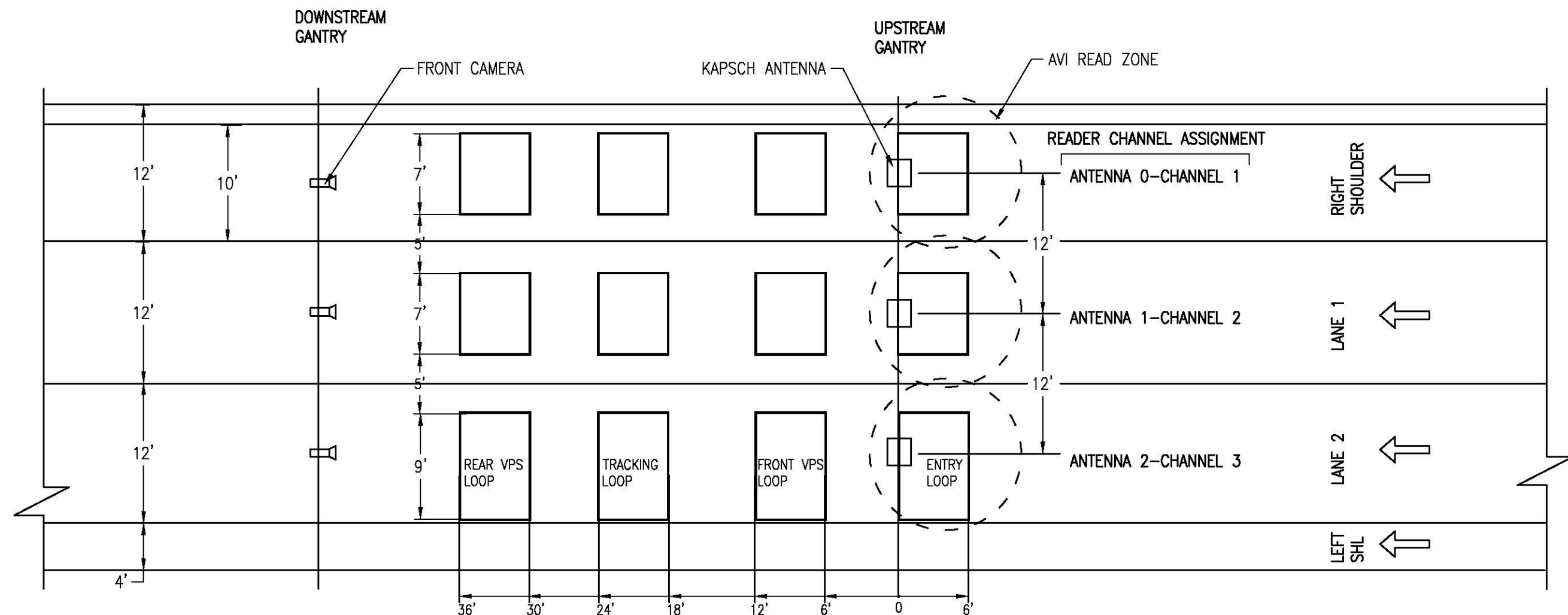
AS-BUILT

REVISION		DATE	APPROVED
LTR	DESCRIPTION		
A	AS-BUILT	09-30-17	




12410 MILESTONE CENTER DRIVE
4TH FLOOR
GERMANTOWN, MD 20876

CONTRACT NO. —		NCTA RTCS 3 LANE TOLL ZONES T22 KAPSCH ANTENNA LAYOUT			
ENGINEER LFUKSON					
DATE 07/19/17					
DRAWN —					
APPROVAL —		SIZE B	DRAWING NO. E03d-RF		REV A
APPROVAL —		SCALE: N/S SHEET OF			



NOTES:

1. APPLICABLE FOR TOLL ZONES: T10 (6-3), T05 (7.1), T06 (7.2), T02 (8.2), T31 (1.3)
2. INSTALL ANTENNA 0 OVER THE CENTER OF RIGHT SHOULDER KEEP ANTENNA LATERAL SPACING 12'+/-1'
3. INSTALL ONE CIRCULATOR FOR EACH ANTENNA. SEE DRAWINGS E03h-RF AND E01-RF FOR DETAILS.
4. RE-ROUTE TWO EXISTING LMR-600 CABLES FROM CABLE TRAY TO CIRCULATOR AND RE-TERMINATE THEM WITH N-MALE RFN-1006-9L2 CONNECTORS. THE CONNECTORS COME WITH MOUNTING KIT SUPPLIED BY KAPSCHD
5. THESE TOLL ZONES CURRENTLY HAVE 6 TRANSORE ANTENNAS INSTALLED.

AS-BUILT

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	09-30-17	

CONDUENT

12410 MILESTONE CENTER DRIVE
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CONTRACT NO.

ENGINEER
LFUKSON

DATE
07/18/17

DRAWN

APPROVAL

APPROVAL

NCTA RTCS

3 LANE TOLL ZONES
T02, T05, T06, T10, T31
KAPSCH ANTENNA LAYOUT

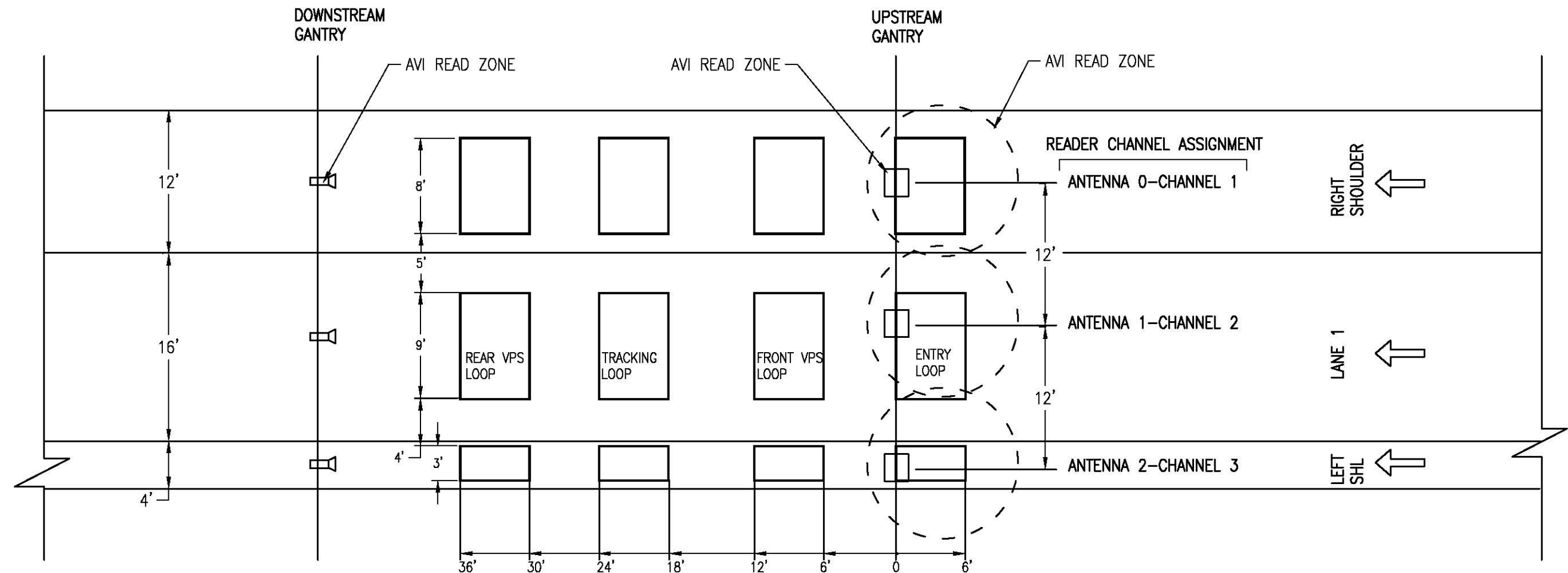
SIZE
B

DRAWING NO.
E03e-RF

REV
A

SCALE:
N/S

SHEET OF



NOTES:

1. APPLICABLE FOR TOLL ZONES: T09 (6.4), T01 (8.1).
2. INSTALL ANTENNA 0 OVER THE CENTER OF RIGHT SHOULDER KEEP ANTENNA LATERAL SPACING 12'+/-1'
3. INSTALL ONE CIRCULATOR FOR EACH ANTENNA. SEE DRAWINGS E03h-RF AND E01-RF FOR DETAILS.
4. RE-ROUTE TWO EXISTING LMR-600 CABLES FROM CABLE TRAY TO CIRCULATOR AND RE-TERMINATE THEM WITH N-MALE RFN-1006-9L2 CONNECTORS. THE CONNECTORS COME WITH MOUNTING KIT SUPPLIED BY KAPSCH
5. RUN AND TERMINATE AN ADDITIONAL LMR-600 CABLE TO THE LAST ANTENNA 2
6. THESE TOLL ZONES CURRENTLY HAVE 5 TRANSORE ANTENNAS INSTALLED.

AS-BUILT

REVISION		DATE	APPROVED
LTR	DESCRIPTION		
A	AS-BUILT	09-30-17	

CONDUENT

12410 MILESTONE CENTER DRIVE
4TH FLOOR
GERMANTOWN, MD 20876



CONTRACT NO.

ENGINEER
LFUKSON

DATE
07/18/17

DRAWN

APPROVAL

APPROVAL

NCTA RTCS

3 LANE TOLL ZONES

T01, T09

KAPSCH ANTENNA LAYOUT

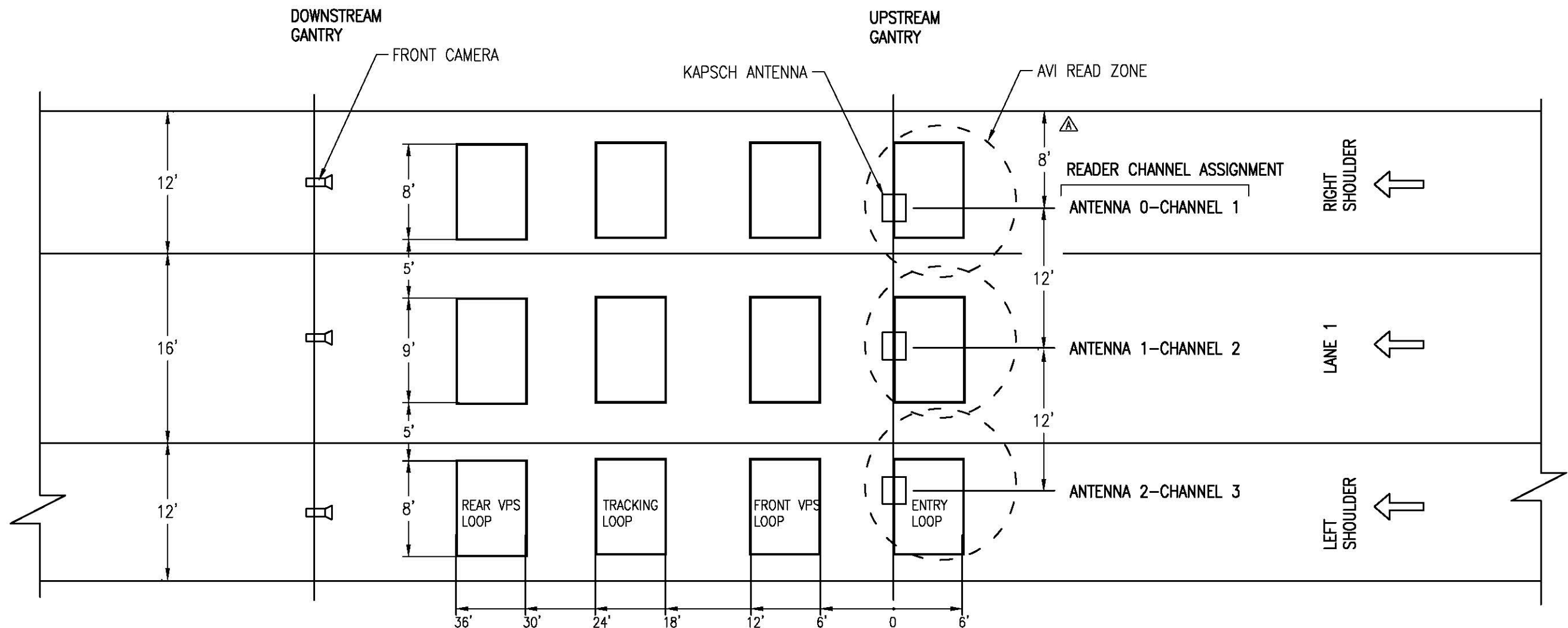
SIZE
B

DRAWING NO.
E03f-RF

REV
A

SCALE:
N/S

SHEET OF



NOTES:

1. APPLICABLE FOR TOLL ZONES: T32 (1.4).
2. INSTALL ANTENNA 0 8' FROM THE OUTSIDE EDGE OF LANE 0 KEEP ANTENNA LATERAL SPACING 12'+/-1' $\triangle$
3. INSTALL ONE CIRCULATOR FOR EACH ANTENNA. SEE DRAWINGS E03h-RF AND E01-RF FOR DETAILS.
4. RE-ROUTE TWO EXISTING LMR-600 CABLES FROM CABLE TRAY TO CIRCULATOR AND RE-TERMINATE THEM WITH N-MALE RFN-1006-9L2 CONNECTORS. THE CONNECTORS COME WITH MOUNTING KIT SUPPLIED BY KAPSCH
5. THIS TOLL ZONE CURRENTLY HAS 6 TRANSORE ANTENNAS INSTALLED

AS-BUILT

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
A	ANTENNAS ARE MOVED OVER 2' TO THE LEFT	08-07-17	
B	AS-BUILT	09-30-17	

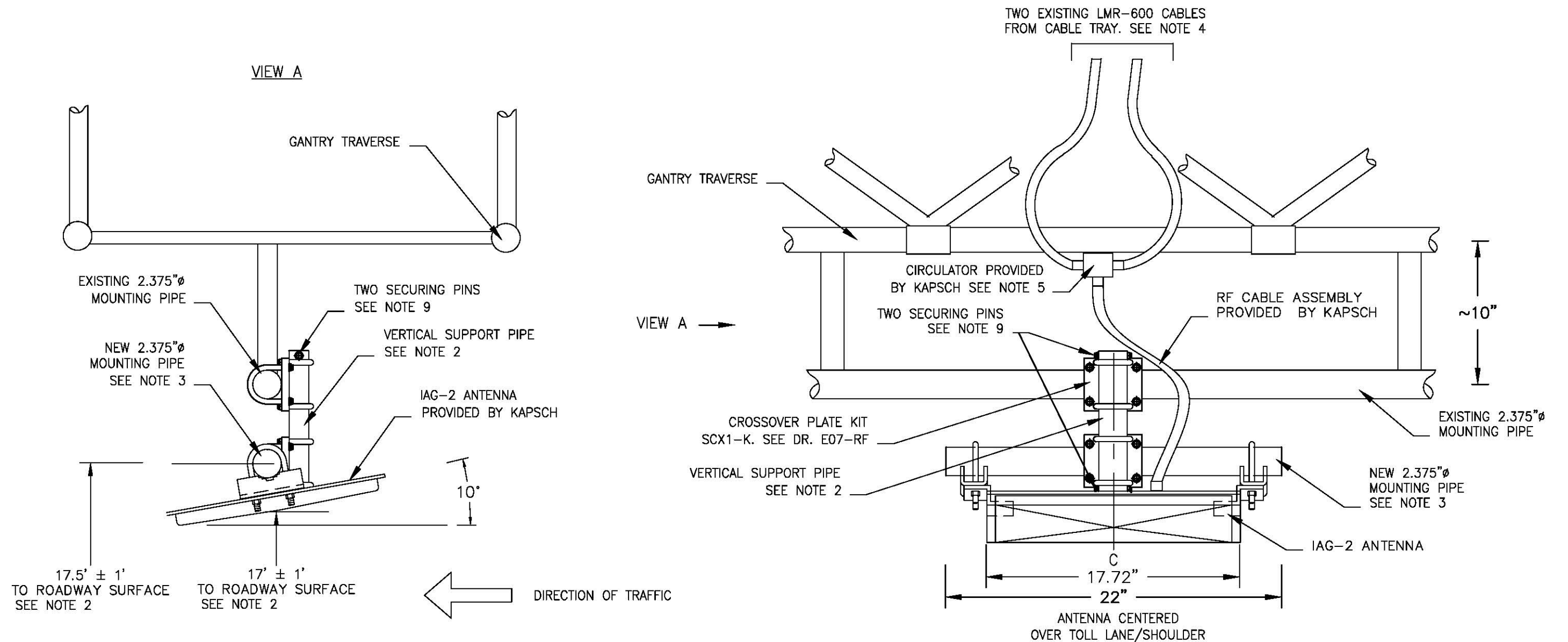
CONDUENT

12410 MILESTONE CENTER DRIVE
4TH FLOOR
GERMANTOWN, MD 20876



CONTRACT NO.	—
ENGINEER	LFUKSON
DATE	07/18/17
DRAWN	—
APPROVAL	—
APPROVAL	—

NCTA RTCS		
3 LANE TOLL ZONES		
T32		
KAPSCH ANTENNA LAYOUT		
SIZE	DRAWING NO.	REV
B	E03g-RF	B
SCALE:	SHEET 1 OF 1	
N/S		



- NOTES:
1. INSTALL ANTENNA 0 OVER THE CENTER OF RIGHT SHOULDER, KEEP LATERAL SPACING BETWEEN ALL ANTENNAS 12'+/-1'. SEE DRAWINGS E03-E03g FOR DETAILS.
 2. INSTALL A NEW 22" LONG MOUNTING PIPE INDIVIDUALLY FOR EACH ANTENNA AT THE HEIGHT OF 17.5' THAT PLACES THE CENTER OF THE ANTENNA FACE AT 17' HEIGHT FROM THE GROUND AS REQUIRED. BUILD AN ADJUSTABLE MOUNT FOR EACH ANTENNA USING TWO CROSSOVER PLATE KIT SCX1-K FROM VALMONT CO. AND A 2.375"Ø GALVANIZED STEEL PIPE FOR VERTICAL SUPPORT. THE VERTICAL SUPPORT PIPE WILL BE IN THE RANGE OF 18"-43" DEPENDING ON TOLL ZONE. SEE DRAWINGS E02-RF, E07-RF AND E08-RF FOR DETAILS.
 3. USE A 2.375"Ø GALVANIZED STEEL PIPE 22" LONG AS ANTENNA MOUNTING BAR FOR EACH KAPSCH ANTENNA.
 4. RE-ROUTE TWO EXISTING LMR-600 CABLES FROM CABLE TRAY TO CIRCULATOR AND RE-TERMINATE THEM WITH N-MALE RFN-1006-9L2 CONNECTORS IF NEEDED. THE CONNECTOR SUPPLIED BY KAPSCH.
 5. INSULATE CIRCULATOR AND ANTENNA CONNECTORS BY WRAPPING UP SELF-FUSING SILICON TAPE. COMES WITH MOUNTING KIT.
 6. SECURE THE CIRCULATOR AND CABLES TO AVAILABLE STRUCTURE MEMBERS BY USING TIE WRAPS INCLUDED WITH MOUNTING KIT.
 7. MINIMUM LMR-600 BEND RADIUS IS 9"
 8. CAMERA AND CAMERA ILLUMINATOR ARE NOT SHOWN FOR DRAWING CLARITY
 9. TO PROTECT VERTICAL PIPE FROM SLIDING DOWN PRE-DRILL A 1/2" HOLE AT THE BOTTOM OF THE VERTICAL PIPE. DRILL ANOTHER 1/2" AT THE TOP OF THE VERTICAL PIPE AFTER ANTENNA HEIGHT ADJUSTMENT IS COMPLETE. INSERT A STAINLESS STEEL 1/2" THREADED ROD IN EACH HOLE AND SECURE THEM BY LOCKING WASHERS AND NUTS.

AS-BUILT

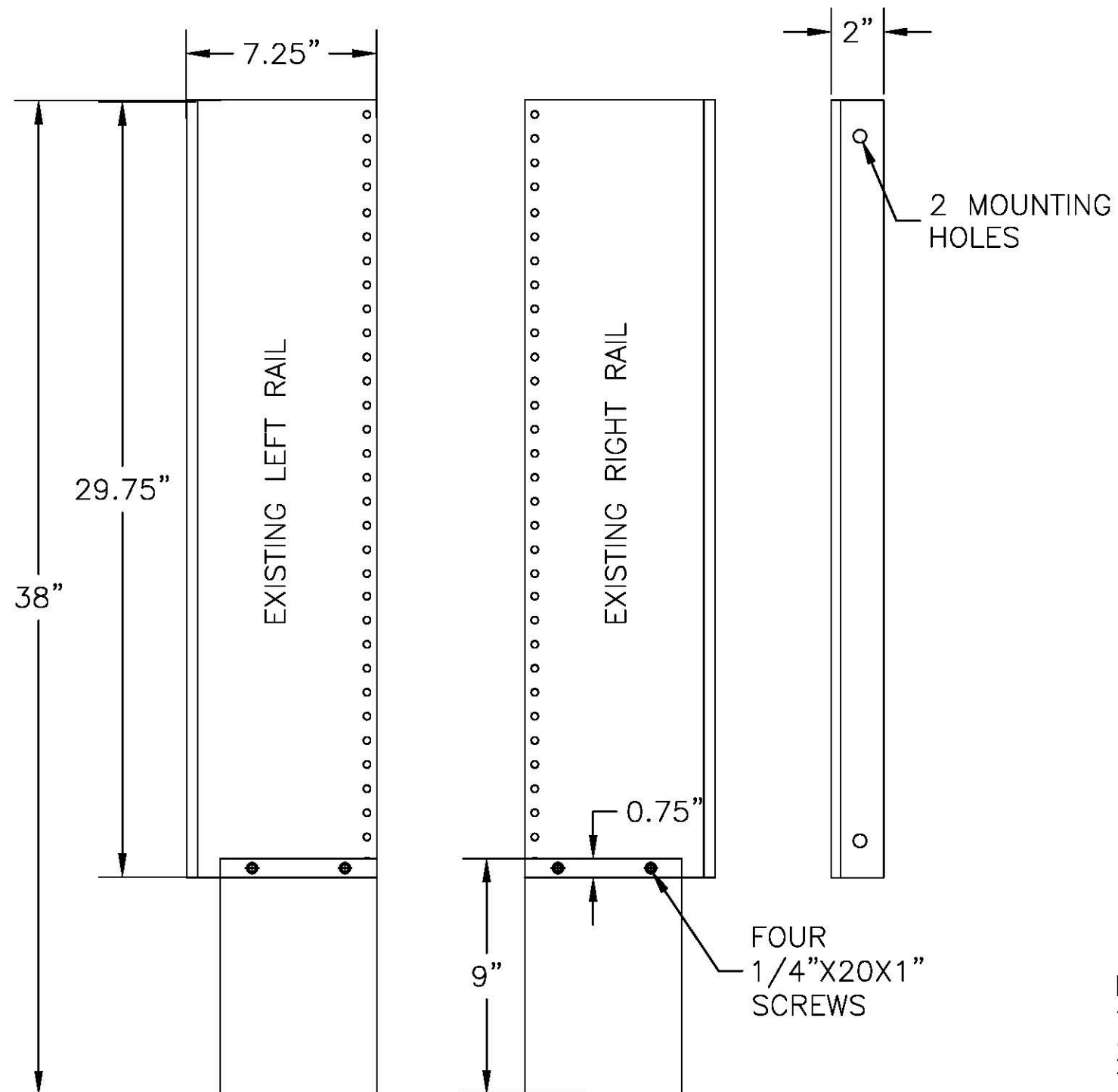
REVISION			
LTR	DESCRIPTION	DATE	APPROVED
A	AS-BUILT	09-30-17	

CONDUENT

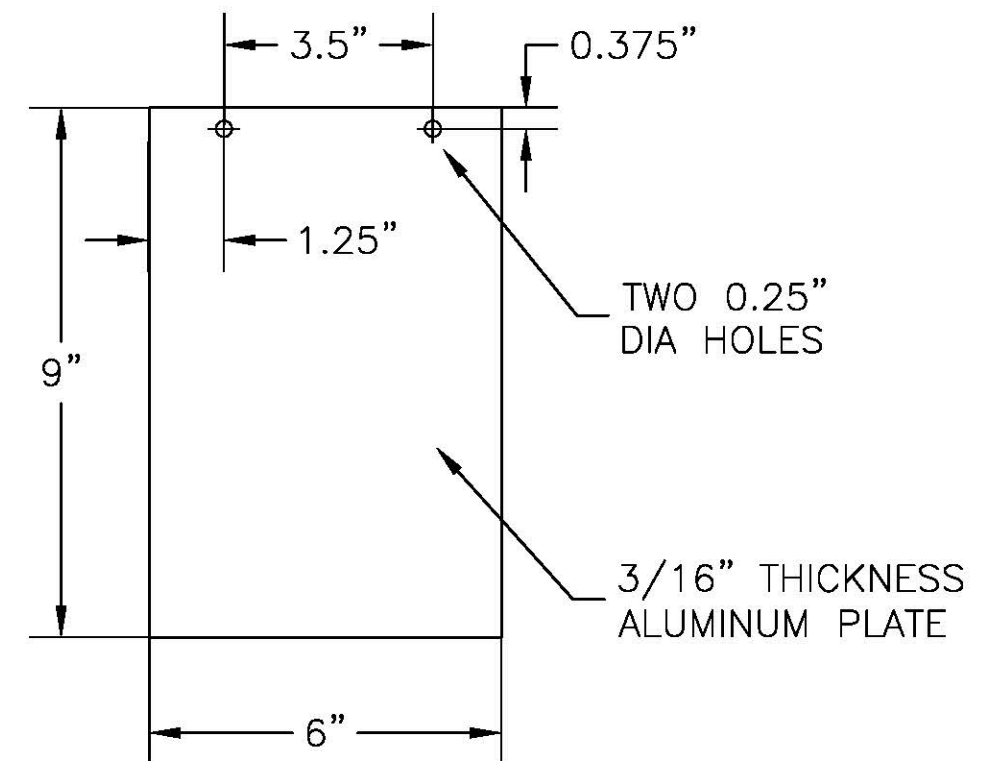
12410 MILESTONE CENTER DRIVE
4TH FLOOR
GERMANTOWN, MD 20876

CONTRACT NO.	-
ENGINEER	ENGINEER
DATE	07/19/17
DRAWN	LFUKSON
APPROVAL	-
APPROVAL	-

NCTA RTCS		
OPEN ROAD TOLLING		
KAPSCH ANTENNA		
TYPICAL INSTALLATION DETAILS		
SIZE	DRAWING NO.	REV
B	E03h-RF	A
SCALE:	N/S	SHEET OF



RACK RAIL EXTENDER PLATE DETAILS



- NOTE:
1. MANUFACTURE 40 EXTENDER PLATES FOR THE PROJECT
 2. USE SELF-TAPPING SCREWS FOR MOUNTING DEVICES IN THE EXTENDED AREA OF THE RAIL

AS-BUILT

REVISION		DATE	APPROVED
LTR	DESCRIPTION		
A	AS-BUILT	09-30-17	

CONDUENT

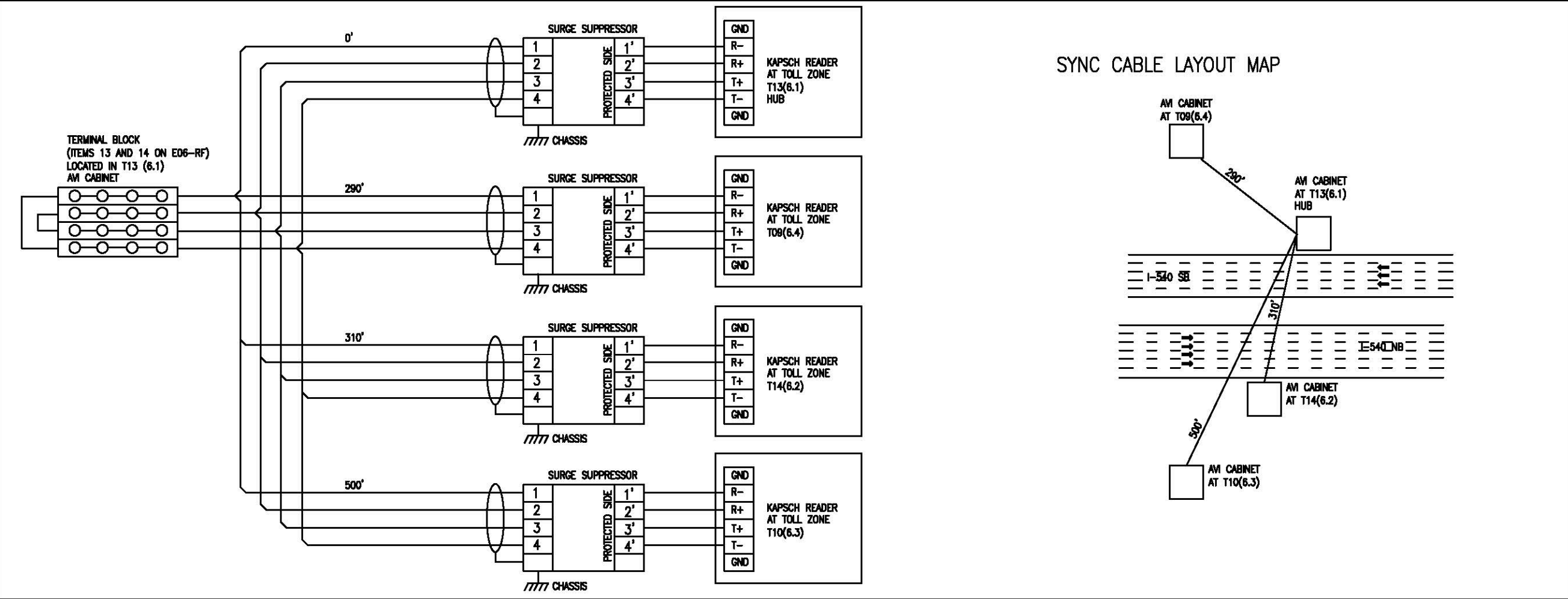
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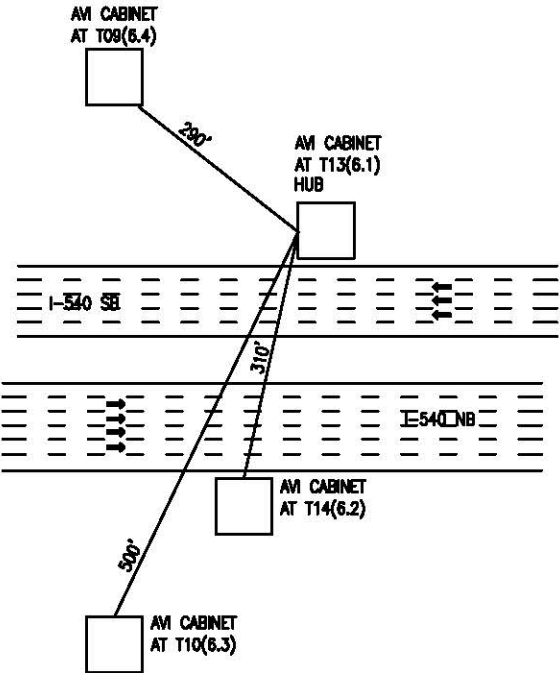
CONTRACT NO.	-
ENGINEER	LFUKSON
DATE	07/19/17
DRAWN	-
APPROVAL	-
APPROVAL	-

NCTA RTCS		
OPEN ROAD TOLLING		
AVI CABINET		
RACK RAIL EXTENDING DETAILS		
SIZE	DRAWING NO.	REV
B	E04	A
SCALE:	N/S	SHEET OF

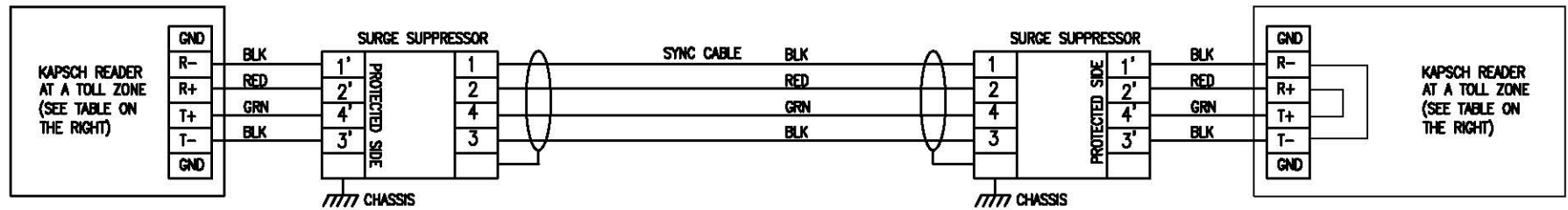
SYNCHRONIZATION WIRING DIAGRAM FOR READERS: T13(6.1, HUB), T09(6.4), T14(6.2), T10(6.3) ONLY



SYNC CABLE LAYOUT MAP



SYNCHRONIZATION WIRING DIAGRAM FOR ALL OTHER READERS.



AM READER AT:	SYNC CABLE LENGTH	AM READER AT:
T01(8.1)	770'	T02(8.2)
T05(7.1)	1500'	T06(7.2)
T17(5.1)	240'	T18(5.2)
T21(4.1)	580'	T22(4.2)
T25(3.1)	240'	T26(3.2)
T29(2.1)	1250'	T30(2.2)
T31(1.3)	1050'	T32(1.4)
T33(1.1)	240'	T34(1.2)

- NOTES:
1. REPLACE EXISTING SYNC CABLE WITH BELDEN 9730 AT ALL TOLL ZONES AND TERMINATE IT AS SHOWN ABOVE. .
 2. INSTALL SURGE SUPPRESSOR DEVICE ON A DIN-RAIL OF AM SWITCH ASSEMBLY. SEE DRAWINGS E06-RF FOR DETAILS.

AS-BUILT

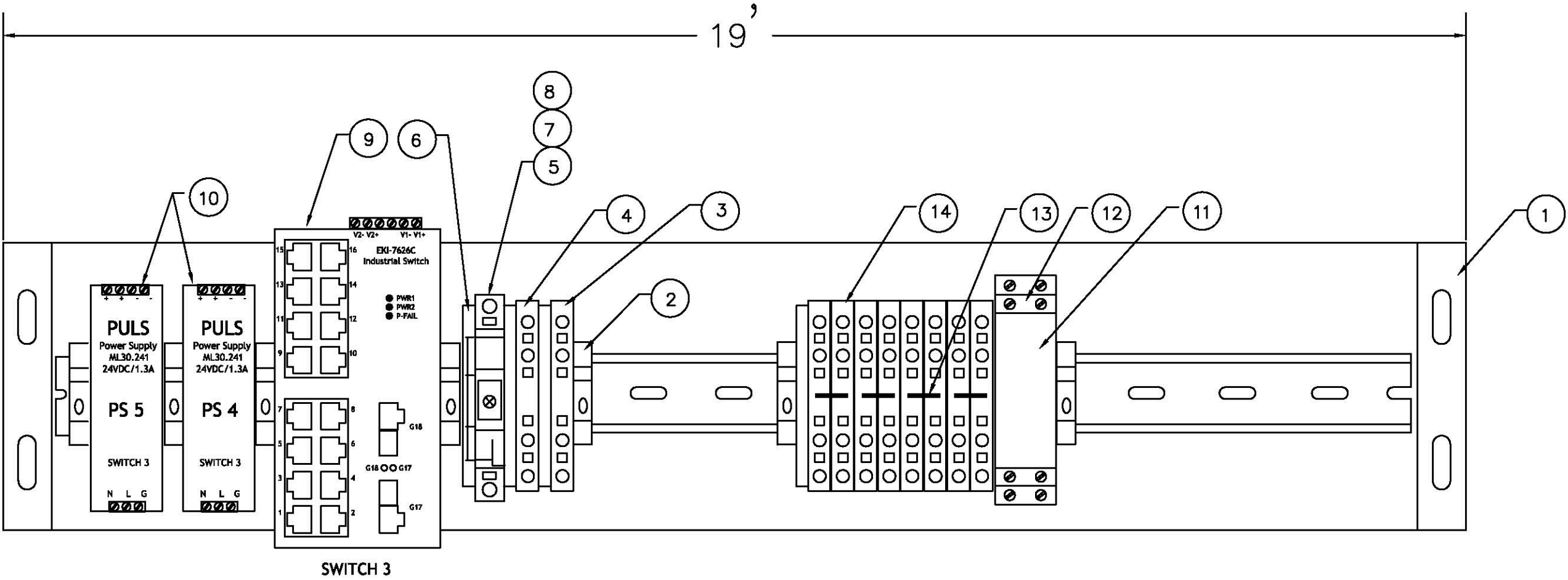
LTR	REVISION		DATE	APPROVED
	DESCRIPTION			
A	AS-BUILT		09-30-17	

CONDUENT

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4TH FLOOR
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CONTRACT NO.	
ENGINEER	LFUKSON
DATE	07/18/17
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APPROVAL	
APPROVAL	

NCTA RTCS OPEN ROAD TOLLING KAPSCH READERS SYNCHRONIZATION WIRING DIAGRAM		
SIZE	DRAWING NO.	REV
B	E05-RF	A
SCALE:	N/S	SHEET 1 OF 1



POS	DESCRIPTION	P/NUMBER	MANUFACTURER	Q-TY FOR 1 ASSEMBLY	COMMENTS
1	RACKMOUNT DIN-RAIL BRACKET, 2U	DIN-RACK-2U	AAXEON	1	
2	BRACKET END, WEW 35/2	106120	WEIDMULLER	7	
3	ZDU 2.5N/4AN (GROUND) TERM.BLOCK (GRN)	160866	WEIDMULLER	1	
4	ZDU 2.5N/4AN (FEED THROUGH) TERM.BLOCK (WHT)	168348	WEIDMULLER	1	
5	FUSE HOLDER ZSI 2.5 (120V)	161642	WEIDMULLER	1	
6	ZAP/TW3 SEPARATOR (BEIGE)	160880	WEIDMULLER	3	
7	3A 5x20MM FAST ACTING FUSE	504-GMA-3	C BUSSMAN	1	
8	ZAP/TNHE ZSI 2.5 END PLATE	161084	WEIDMULLER	1	
9	ETHERNET SWITCH 3, UNMANAGED 10 PORTS	EKI-7629CI	ADVANTECH	1	
10	POWER SUPPLY, 24VDC/1.3A	ML30.241	WEIDMULLER	2	
11	SURGE SUPPRESSOR MODULE	920370	DEHNCONNECT	1	
12	SURGE SUPPRESSOR BASE	920300	DEHNCONNECT	1	
13	ZQV 2.5N/2 POLE (INTERNAL JUMPER)	169381	WEIDMULLER	4	FOR READER T13(6.1) ONLY
14	ZDU 2.5/4AN (FEED THROUGH) TERM BLOCK (BEIGE)	160857	WEIDMULLER	8	FOR READER T13(6.1) ONLY
15					

NOTES:
1. APPLICABLE FOR ALL READERS. COMPONENTS POS. 13, 14 ARE USED FOR READER T13(6.1) ONLY.
2. DIN-RAIL BRACKET POS. 1 MUST BE PROPERLY GROUNDED
3. TO BUILD THIS PANEL TAKE COMPONENTS POS. 2-10 OUT OF EXISTING AVI PANEL

AS-BUILT

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
A	09-30-17	09-30-17	

CONDUENT

12410 MILESTONE CENTER DRIVE
4TH FLOOR
GERMANTOWN, MD 20876



CONTRACT NO.	—
ENGINEER	LFUKSON
DATE	07/18/17
DRAWN	—
APPROVAL	—
APPROVAL	—

NCTA RTCS OPEN ROAD TOLLING KAPSCH READER SWITCH PANEL		
SIZE B	DRAWING NO. E06-RF	REV A
SCALE: N/S SHEET 1 OF 1		

TABLE 1. ANTENNA MOUNTING HEIGHT AS-BUILT

TOLL ZONE	LOCATION	DIR	MILE MARKER	LANE	ANTENNA HEIGHT
T01(8.1)	RAMP NC 147 NB ON FROM HOPSON RD/ DEVIS DRIVE	NB	3.1	RSH	167'-11"
				LN1	16'-10"
				LSH	16'-09"
T02(8.2)	RAMP NC 147 SB OFF FROM HOPSON RD/ DEVIS DRIVE	SB	3.1	RSH	17'-0"
				LN1	16'-8"
				LN2	16'-7"
T05(7.1)	RAMP NC 540 NB TO NC 147 NB	NB	67.7	RSH	17'-0"
				LN1	17'-0"
				LN2	17'-0"
T06(7.2)	RAMP NC 147 SB TO NC 540 SB	SB	67.6	RSH	17'-3"
				LN1	17'-0"
				LN2	16'-8"
T09(6.4)	RAMP NC 540 SB TO NC 147 NB	SB	68.2	RSH	17'-0"
				LN1	17'-0"
				LSH	17'-0"
T10(6.3)	RAMP NC 147 SB TO NC 540 NB	SB	68.2	RSH	17'-6"
				LN1	17'-7"
				LN2	17'-2"
T13(6.1)	MAINLINE NC 540 SB AT NC 147	SB	68.2	RSH	17'-1"
				LN1	17'-0"
				LN2	17'-0"
				LN3	17'-1"
				LSH	17'-1"
T14(6.2)	MAINLINE NC 540 NB AT NC 147	NB	68.2	RSH1	17'-6"
				RSH2	17'-2"
				LN1	17'-8"
				LN2	17'-4"
				LN3	16'-11"
				LSH	17'-1"
T17(5.1)	MAINLINE NC 540 NB NORTH OF GREEN LEVEL ROAD	NB	62.7	RSH	17'-6"
				LN1	17'-4"
				LN2	17'-3"
				LN3	17'-2"
				LSH	17'-4"
T18(5.2)	MAINLINE NC 540 SB NORTH OF GREEN LEVEL ROAD	SB	62.7	RSH	17'-6"
				LN1	17'-6"
				LN2	17'-4"
				LN3	17'-4"
				LSH	17'-4"

TABLE 1. CONTINUE

TOLL ZONE	LOCATION	DIR	MILE MARKER	LANE	ANTENNA HEIGHT
T21(41)	RAMP NC 540 NB ON FROM US 64	NB	59.6	RSH	17'-8"
				LN1	17'-7"
				LN2	17'-4"
				LSH	17'-0"
T22(4.2)	RAMP NC 540 SB OFF TO US 64	NB	59.6	RSH	16'-11"
				LN1	17'-2"
				LSH	17'-4"
T25(3.1)	MAINLINE NC 540 NB NORTH OF SALEM ST.	NB	57.3	RSH	17'-5"
				LN1	17'-2"
				LN2	17'-0"
				LN3	17'-0"
T26(3.2)	MAINLINE NC 540 SB NORTH OF US1	SB	57.3	LSH	17'-4"
				RSH	17'-3"
				LN1	17'-2"
				LN2	17'-1"
T29(2.1)	RAMP NC 540 NB OFF TO US1	NB	56.8	LN3	17'-1"
				LSH	17'-0"
				RSH	17'-4"
				LN1	17'-1"
T30(2.2)	RAMP NC 540 SB ON FROM US1	SB	56.8	LN2	17'-1"
				LSH	17'-3"
				RSH	17'-1"
T31(1.3)	VERIDEA PARKWAY TO TO NC 540 NB	NB	55	RSH	17'-7"
				LN1	17'-4"
				LN2	17'-4"
T32(1.4)	MAINLINE NC 540 SB NORTH OF US1	SB	55	RSH	17'-11"
				LN1	17'-9"
				LSH	17'-7"
T33(1.1)	MAINLINE NC 540 NB NORTH OF NC 55	NB	54.3	RSH	17'-0"
				LN1	17'-0"
				LN2	17'-0"
				LN3	17'-0"
				LN4	17'-0"
				LSH	17'-0"
T34(1.2)	MAINLINE NC 540 SB NORTH OF NC 55	SB	54.3	RSH	17'-4"
				LN1	17'-2"
				LN2	17'-0"
				LN3	17'-5"
				LN4	17'-7"
				LSH	17'-6"

AS-BUILT

REVISION		DATE	APPROVED
LTR	DESCRIPTION		
A	AS-BUILT	09-30-17	

CONDUENT

12410 MILESTONE CENTER DRIVE
4TH FLOOR
GERMANTOWN, MD 20876



CONTRACT NO. —		NCTA RTCS OPEN ROAD TOLLING KAPSCH READER ANTENNA MOUNTING HEIGHTS		
ENGINEER LFUKSON				
DATE 05/25/17				
DRAWN —				
APPROVAL —				
APPROVAL —		SIZE <i>B</i>	DRAWING NO. <i>E07-RF</i>	REV <i>A</i>
APPROVAL —		SCALE: N/S SHEET 1 OF 1		